CHEM 441: Molecules That Changed the World — Spring 2015

Instructor: K.C. Nicolaou, BRC 363
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Office Hours: By appointment. There is a TA for this course.

Goals: This course, based on the recent book by Nicolaou and Montagnon, will expound on our learned knowledge of some of Nature's most intriguing molecules and the ability of Man to discover, synthesize, modify and use them to our advantage in what was not formerly envisioned. Through the development of the theme, it is hoped that one will also discover just how profound the impact of chemistry is in our lives. The course will also explore some of the most exciting frontiers in modern science and medicine, and the opportunities they present to young students for future careers. The lectures will touch upon fascinating tales about molecules and their presence in, among many items, foods, perfumes, dyes, high tech materials, textiles, vitamins, nutritional supplements, pesticides, insecticides, and medicines.

Prerequisites: CHEM 212 or 320

Required Texts: K.C. Nicolaou and Tamsyn Montagnon, *Molecules That Changed the World*, Wiley-VCH, **2008**.
ISBN: 3-527-29284-5. Available from Wiley-VCH or Amazon
(hard cover: $55.00; also available at Rice Bookstore).

Recommended Books: E.J. Corey, László Kürti and Barbara Czakó, *Molecules and Medicine*, Wiley, **2007**.
ISBN: 978-0-470-22749-7.

Lectures and Tutorials: Lectures will be held in the BioScience Research Collaborative (BRC), Room 286, on Tuesdays and Thursdays from 8:00 – 9:15 a.m. Tutorials will be held in BRC, Room 308, from 7:00 – 8:00 p.m. on Thursday nights.

Exams and Assignments: Exam: A comprehensive exam will be given on Thursday, February 26 during the normal class period. No make up exams will normally be allowed.

Assignment 1: Choose one chapter from the book *Molecules That Changed the World* not presented in class (Chapters 3, 5, 12, 14, 17, 20, or 26), and write a one-page, single spaced essay on it. Your essay should include the discoverer(s), the molecular structures, and the mechanism of action of your molecules, as well as other significant facts. Grading will be based on content, organization, and accuracy.

Assignment 2: Write a one-page, single spaced essay on the book *Molecules That Changed the World* summarizing the essence of its contents and emphasizing what you learned from reading it. Grading will be based on content, organization, and clarity.

Reading before each class: By doing so, you will be able to participate in class more effectively.

Grades: Exam: 250 points
Assignment 1: 125 points
Assignment 2: 125 points

Disabilities: Student disabilities will be accommodated in accordance with the guidelines put forth by Disability Support Services (DSS). Students should register with the DSS Office in Allen Center and let the instructor know of their disabilities and needs as soon as possible.

Honor Code: The Rice University Honor Code applies to this course. Both assignments 1 and 2 are to be exclusively the work of each individual student. Proper references must be given to any original work when included in these home assignments.

CHEM 441: Molecules That Changed the World **Spring 2015**

Schedule
(Subject to Change)

Week 1	Tuesday, **Jan 13**	Lecture 1	Introduction: Atoms, Molecules & Synthesis Urea & Acetic Acid	Chapter 1 Chapter 2
	Thursday, **Jan 15**	Lecture 2	Aspirin® Terpineol	Chapter 4 Chapter 6
Week 2	Tuesday, **Jan 20**	Lecture 3	Tropinone Haemin Quinine	Chapter 7 Chapter 8 Chapter 9
	Thursday, **Jan 22**	Lecture 4	Morphine Steroids & the Pill	Chapter 10 Chapter 11
Week 3	Tuesday, **Jan 27**	Lecture 5	Penicillin Prostaglandins & Leukotrienes	Chapter 13 Chapter 15
	Thursday, **Jan 29**	Lecture 6	Vitamin B_{12} Monensin	Chapter 16 Chapter 18
Week 4	Tuesday, **Feb 3**	Lecture 7	Avermectin Ginkgolide B	Chapter 19 Chapter 21
	Thursday, **Feb 5**	Lecture 8	Cyclosporin, FK506 & Rapamycin Calicheamicin γ_1^I	Chapter 22 Chapter 23
Week 5	Tuesday, **Feb 10**	Lecture 9	Palytoxin Taxol®	Chapter 24 Chapter 25
	Thursday, **Feb 12**	Lecture 10	Brevetoxin B Ecteinascidin 743	Chapter 27 Chapter 28
Week 6	Tuesday, **Feb 17**	Lecture 11	Epothilones Resiniferatoxin	Chapter 29 Chapter 30
	Thursday, **Feb 19**	Lecture 12	Vancomycin Thiostrepton	Chapter 31 Chapter 32
Week 7	Tuesday, **Feb 24**	Lecture 13	Small Molecule Drugs Biologics	Chapter 33 Chapter 34
	Thursday, **Feb 26**	Exam		**Assignments 1 and 2 due by Monday, March 2**